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NAVAL POSTGRADUATE SCHOOL

Monterey, California

NAVAL POSTGRADUATE SCHOOL
PARTICIPATION IN AN ACCAT
MULTI-NODE EXPERIMENT

by

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Planning, conduct and review of results of a multi-node experiment conducted by NOSC, NPS and CINCPACFLEET in October of 1980 are discussed from the NPS point of view. Lessons learned and suggestions for future experiments are included.

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INTRODUCTION

The Advanced Command and Control Architectural Testbed (ACCAT) facility at the Naval Ocean Sciences Center, San Diego, conducted an extensive experiment in October of 1980 for the purpose of demonstrating ACCAT capabilities and identifying areas in which additional development is required. The demonstration involved three sites: the ACCAT facility at NOSC, Pacific Fleet Headquarters (CPF) in Hawaii, and the Naval Postgraduate School in Monterey. The demonstration was in a context of coordinated operations afloat with a task force commander and his subordinate warfare commanders. The Warfare Environment Simulator (WES) was used in an effort to create a realistic environment for interactions among the warfare commanders and subordinates. The details of the experiment can be found in reference [1] and will not be repeated here. The Command, Control and Communication (C^3) laboratory facility at NPS simulated the Anti-surface Warfare Commander (ASUWC) in the demonstration. NPS faculty and graduate students served as players manning the ASUWC. Reference [2] contains a careful description of the responsibilities of NPS participants.

This report reviews the goals and documents the conduct and conclusions of the experiment from the NPS point of view. It also records some lessons learned with respect to possible future multi-node experiments.

Naval Postgraduate School participation in the experiment was funded under contract number CF01831A50 from NOSC. Both faculty and students at NPS were involved in the

experiment. In addition contract support was provided to NPS by Rolands and Associates. The contractors' task was to prepare the laboratory facilities (hardware and software) for the experiment, to provide a detailed set of instructions for each NPS participant and to evaluate the conduct and results of the experiment from the NPS Viewpoint. The remainder of this document incorporates much of the material provided by Rolands and Associates to NPS.

GOALS

The overall goals of the October ACCAT - Remote Site Module Multi-node Network Experiment were to demonstrate the current ACCAT capability and to evaluate existing software technologies. Specific goals included:

a) assessing the responsiveness of the ACCAT computer resources in a full interactive experiment,

b) evaluating the suitability of exchanging messages, data, and graphics in ACCAT via the ARPANET,

c) determining the problems associated with demonstrating the information processing technologies in ACCAT and

d) establishing requirement needed to enhance current capabilities for evaluation of future concepts and technologies.

In addition to these broad goals of the experiment as a whole, two related objectives were considered in the NPS C^3 laboratory. These were

a) to investigate the utility of TED and its associated relational data base by running the TED program simultaneously with the WES simulation, and

b) to demonstrate the practicality of voice input for computer control, by operating one of the player stations with voice input.

Laboratory Configuration

The majority of the NPS C^3 laboratory equipment was used during the 3 day demonstration. Figure 1 depicts the laboratory configuration along with the assignment of station numbers which are referred to throughout this report.

Station 1 is the Blue Conrac color graphics situation display.

Station 2 is the Blue status board.

Station 3 is the Blue ASUWC Player keyboard entry station.

Station 4a is the video display for the voice entry system.

Station 4b is the ASUWC player's voice entry equipment.

Station 5-6 Not used.

Station 7 Blue data base officer accessing TED.

Station 8-9 Not used.

Station 10 Blue situation display an echo of Station 1.

Station 11 Hard copy unit for the Blue Communication Officer receive only station.

Station 12 Blue Communications Officer receive only CRT.

Station 13 Blue Communications Officer transmit only CRT.

Station 14 Blue Weather Officer.

Station 15-19 Not used.

Station 20 NPS 11/70 system technician.

Station 21 NPS EXSUP (Umpire) communication between other remote site umpires.

Station 22 Color graphics plot initiation station which runs PLOTGN program.

Station 23-24 Not used.

Station 25 EXSUP status board.

Station 26 EXSUP color graphics situation display.

Station 27 Echo monitor of NOSC EXSUP Player program.

Station 28 Large screen Blue force color situation display.

OBSERVATIONS AND RECOMMENDATIONS

1. TENEX overload problems were such that for the 3rd (and final) demonstration NPS was asked to restrict the use of terminals to the absolute minimum necessary for participation as ASUWC in the demonstration. Only eight stations were used in this 3rd demonstration. They were:

a) BLUE STATUSBOARD, an Ann Arbor

b) BLUE PLAYER, keyboard entry, an Ann Arbor

c) BLUE PLAYER, voice entry, a Threshold Technology device

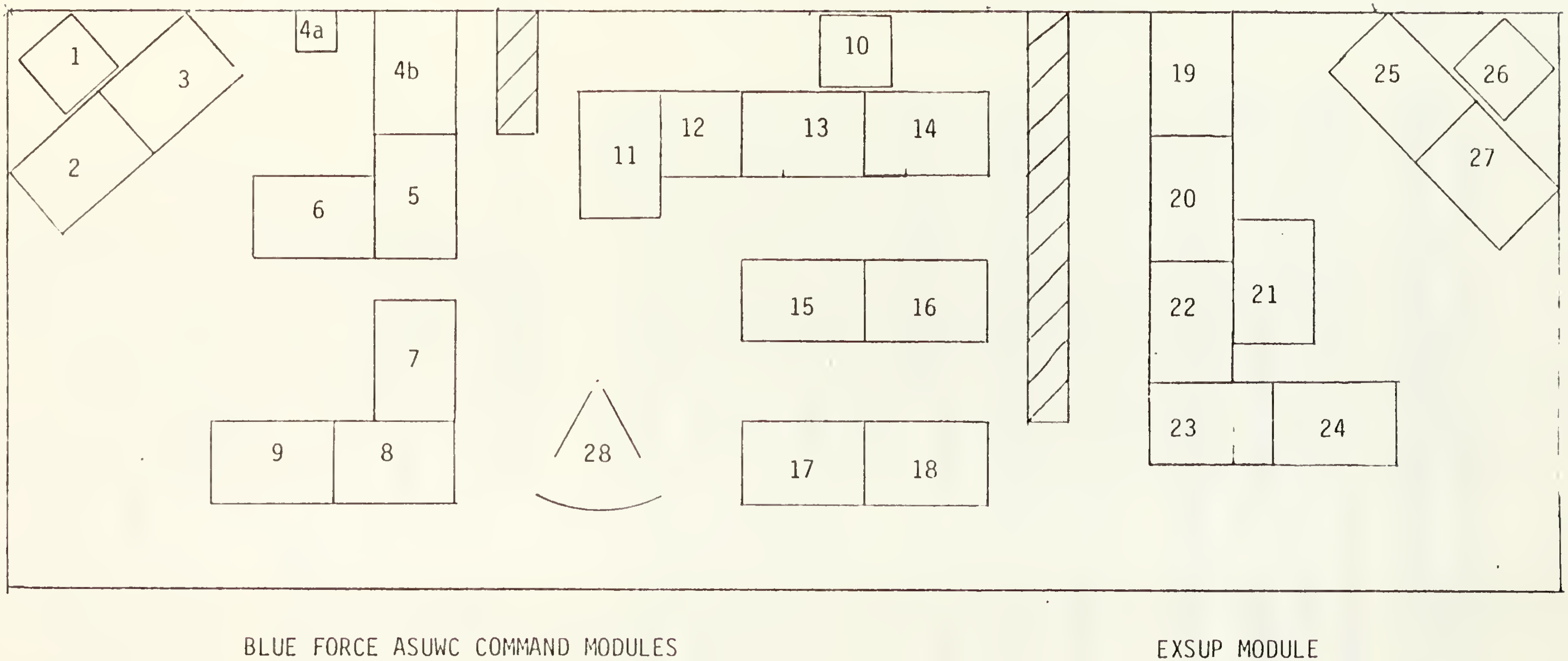
d) BLUE STATUS DISPLAY, Conrac graphics

e) Game Communication consisting of 1 send station, an Ann Arbor

f) one receive station, a Tektronix 4014

g) A PLOTGN terminal, ADM-type

h) Umpire communication, ADM-type



NPS C^3 LABORATORY

ANTI-SURFACE WARFARE CENTER (ASUWC)

CONFIGURATION

```
LINK FROM CDC, TTY 106
@BELL.EXE
@TYPE MSG010
*****************************************************************************

          MSG010

FM:   ASUC

TO:   ASUUC

SUBJ: CONTACT REPORT

EXERCISE KURIL

1. HOLD PROBSUB CORRELATING TO TRACK U002.
REQUEST CONFIRM YOU HOLD NO SURFACE UNIT THAT POSITION.

BT

*****************************************************************************
@BREAK

LINK FROM CDC, TTY 107
@BELL.EXE
@TYPE MSG009
*****************************************************************************

         MSG009

FM:   CUC

TO:   FCC,ASUUC

SUBJ: ACTION SUMMARY

EXERCISE KURIL

1. ONE ORANGE ECHO II SSGN DESTROYED BY LOS ANGELES.
POSITION 47-16N 155-07E.
```

```
BT

*****************************************************************************
***********
@BREAK

LINK FROM CDC, TTY 106
@BELL.EXE
@TYPE MSG008
*****************************************************************************
***********

201000Z                                                              MSG008

FM:   FCC

TO:   CUC,AAUC,ASUC,ASUUC

SUBJ: INTELLIGENCE REPORT

EXERCISE KURIL

1.  INTEL REPORTS ONE CHARLIE AND ONE ECHO-II SSGN
SOUTHWARD. PRESENT POSITION APPROX
48N 156E.

2.  KRESTA TASK GROUP INVOLVED IN PARSONS ATTACK NOW
ESTIMATED 45N 157E.

ORANGE SURFACE UNITS, INCLUDING SOME WITH
SSM CAPABILITY, HAVE SORTIED FROM PETRO.

4.  JAPANESE FISHING FLEET EXPECTED TO ENTER YOUR AREA
FROM NE BOUND FOR HOKKAIDO PORTS.

*****************************************************************************
***********
```

Figure 2

2. Difficulty was experienced in maintaining graphic displays. Recurring problems were encountered in the net and caused the PLOTGN job to terminate. In addition, the lack of land mass representation on the Conrac displays was disconcerting to the players and visitors. WES was heavily taxed, and several consecutive WES pictures were lost to the RSM displays.

3. Incoming ASUWC messages were printed on a Tektronix hard copy device (TEK 4631) after viewing on a Tektronix 4014 storage tube. Because of storage tube technology, any message in excess of one page will overwrite the screen, rendering the messages virtually unintelligible. Fortunately, during the demonstrations, no messages were lost. However, Figure 2 illustrates the phenomenon of overwriting. Future games should be planned so some other device is used for displaying message traffic. The most immediate solution is to use a Miniterm-like (hard copy) terminal. The longer range solution is to capture messages on a computer file with an automatic routing algorithm and another algorithm for creating history files for later analysis.

4. Closely located forces (ships) were difficult to distinguish on the graphic displays. Since the RSM was restricted from "plotting" it was impossible to use the display to aid in identifying various targets.

5. BLUE missiles, when fired, were displayed as white (unknown) tracks. They should have been immediately picked by the system as BLUE tracks.

6. Use of an audio alarm (bell) should be incorporated in the WSSP to sound an alarm when a new message is starting to arrive. This would allow the operator to be aware of incoming messages while engaged in some other activity. In addition, message handling using the WSSP turned out to be cumbersome. Details are contained in the attachments; however, it is suggested that the use of currently available automatic message handling systems such as HERMES or MSG be used in lieu of building a new system for the WSSP. The WSSP, although only partially developed, proved to contain several positive attributes including the menu selection process.

7. Admiral Ekelund strongly recommended the use of standard NTDS symbology for all displays, including the EXSUP. The use of an APL oriented terminal was very frustrating to non APL users. The tendency was for players not to use it.

8. The NPS EXSUP Player was unable to successfully connect to the NOSC EXSUP Player. This capability is important to implement for future games so the RSM participant can monitor overall game action.

9. Errors in the TED database caused problems and contributed to a loss of effectiveness of the NPS-RSM.

10. The need to have at least one practice scenario developed and demonstrated was evident. While the organization of user space and responsibilities were provided, the identification of personnel to operate each station and their introduction to use of the tools was not adequate. Some confusion ensued because of this oversight. In addition, the absence of a common script

decreased the response of the C^3 laboratory participants the first day of the demonstration. The scenario did arrive the evening of October 14th and copies were made and distributed for the following day.

11. Data collection should be an integral requirement of the experiment. A data collection instrument was distributed to each C^3 lab station on each day; however, only a small percentage were completed due to the changes in requirements encountered during the demonstrations. Node to node umpire traffic should be similarly captured, perhaps using a hard copy device such as a Miniterm.

12. The coordination of activities and allocation of resources was a primary consideration for the NPS-RSM. While several participants made themselves available and tried to make the experiment "work" there was no overall cohesive point of contact for coordinating the effort, nor was there authority to commit resources. For example, the availability of a qualified C^3 lab technician after 1630 hours would have been helpful on all three days of the demonstration. On several occasions during the preparation for the experiment the technician had to be called from across campus to reset the system. It is highly recommended that all future ACCAT work that includes NPS-RSM resources be formally scheduled through command channels, i.e. formal communications be exchanged between the NPS and NOSC. This type of arrangement would preclude most problems at NPS concerning C^3 lab resource utilization. The scenarios used in multi-node experiments should be a team effort such that all

node participants develop an early and continued understanding of their involvement. Trying to enumerate every detail of each participant's responsibility in a step by step procedure is practically impossible. Involvement by participants form the very beginning would insure that participants understood their roles in the demonstration and would respond to a given scenario in a realistic manner. This would help eliminate the need for an in-depth detailed and restrictive step by step script of procedures, which at times made participants lose sight of why some of the steps were taken. When system problems or changes occurred, participants didn't have the understanding necessary to change their actions accordingly.

13. Conducting multi-node experiments (or demonstrations) is extremely important to investigate new technologies and their applications to operational environments. These experiments are also important to individuals at the various nodes. In the case of the NPS node, it provides an opportunity to evaluate the utility of a variety of concepts and techniques, as well as permit student and faculty familiarization with the new technologies and the larger system in which the demonstrations are carried out. As such, it is important to be able to "demonstrate" rather than "experiment" during such scheduled, advertised periods, particularly in the early phases of evaluations.

14. An overall recommendation is to implement a small cadre of professionals who can be responsible for the planning, scheduling, and evaluating multi-node demonstrations, implementing new technologies (hardware, software and procedural), and

planning for enhancing C^3 lab equipment, on a continuing basis. This would include:

a. coordinating efforts at all participants sites

- NPS
- CINCPACFLT
- NRL
- NOSC
- ARC
- others,

b. transferring technologies among sites,

c. providing data collection methodologies,

d. communicating plans, schedule and results among participants, and

e. evaluating new hardware, such as displays and I/O devices, for use in the C^3 lab.

HISTORICAL RECORD OF THE NPS-RSM ACTIVITIES

a. Summary.

The equipment (hardware) in the C^3 laboratory worked properly throughout the 3 days of demonstrations. One Miniterm was troublesome because of its APL keyboard. The requirement to minimize the number of terminals during the third day reduced the programmed capability of the NPS-RSM to participate as originally planned. The following describes, by station, software or operational problems encountered during the three days.

b. Station 1.

The graphics displays were interrupted three times the first day and two times the third because of interrupts in the PLOTGN program. On at least two of these occasions the telnet connection closed momentarily and the PLOTGN program disengaged without affecting other WES stations. The exact causes of these interrupts were not identified. It was difficult to immediately discern this problem from the RSM. In many instances the cue was the realization by NPS player participants that the situation display was not updating. This realization took as much as 10 minutes in some cases.

An interrupt in the PLOTGN program requires a complete restart of the plotting routines. Whenever the PLOTGN program was restarted from NPS the land masses would not display. This was because of the way WES sends the situation display; WES sends land masses over the net only when a new PLOT command is entered. For the typical minute update, the changing position of force is all that is needed for the new situation display. Therefore, only new force positions, and not the land masses, are sent over the net. When PLOTGN was reinitialized from NPS, as far as WES was concerned this was any typical minute update, and it would send the force picture without the land mass picture. To correct this problem a considerable amount of added communication over the AUTOVON and computer network was necessary before the BLUE, UMPIRE and ORANGE players in San Diego could be contacted and asked to enter a new PLOT command so NPS could again display land masses. Note when the NPS PLOTGN

program was interrupted it had no effect on the situation displays at CINCPACFLT or NOSC and their pictures were probably being normally received.

A possible long-term solution is to include in WES a capability to know when a PLOTGN program is getting its very first picture and have it send land masses over the net for the first picture. In the short-term it might be sufficient to let every node know what the present PLOT command is so if needed they can enter the same PLOT command thereby receiving the land masses without having to coordinate with NOSC.

Another difficulty experienced with the graphics displays was the long-terms between updates on some occasions. This problem was anticipated when the WES system would be overloaded, and it happened at least three times. The long-terms between updates did not happen as often as predicted by the WES development people of NOSC. During the demonstrations, there would be three to four minute periods when the situation display would not update. This again is explained by the way PLOTGN receives the picture from WES's database. The important fact is it did happen but not to the extent the demonstration was seriously degraded.

The forces displayed at the NPS-RSM were so closely located as to be nearly indistinguishable. BLUE players were not given the freedom to manipulate the displays to see the situation in more detail and in one case, a missile launch, were unable to see well enough to properly target the weapons.

The placing of orange units one on top of another made it impossible to use the color displays for identification of track numbers even if display control was given to each individual player. The spreading out of orange forces in realistic formations would have added to the usefulness of the color display in track identification.

It was also noticed during a BLUE missile launch the BLUE missile tracks were white on the BLUE's situation display. There were many comments by participants on how unrealistic this situation appeared. The white tracks indicated unknown tracks when in fact any missile ship would be able to automatically identify its own missile which have just been launched. The missile tracks should probably beautomatically designated friendly and appear in the appropriate color instead of white for unknown. This suggestion is naturally only for the side which launches the missiles. The opponent should receive them as unknown tracks.

The Superintendent of NPS came to observe the game on the first day. It was his feeling that standard NTDS symbology should be used on the umpires display, as well as the BLUE and orange displays. His suggestion would lose understanding by third party observers and analysis.

c. Station 2. BLUE STATUSBOARD. No problems.

d. Station 3. BLUE PLAYER.

Players were continually concerned with the restriction that they were to do nothing except what was in the script. They questioned the realism of many of the game scenario events

in which they saw positive enemy tracks and had the capability to intercept or attack, but were not allowed to follow through by the scenario. For example one unknown air track fired on BLUE ships and it was still not declared enemy. Obviously, in the actual situation, there would have been no question about the track. Within a true game environment this hopefully wouldn't be a problem, because realistic role playing would be planned. A player's area of concern and responsibilities would be well defined, understood and not ruled by a scripted series of events.

The presence of visitors on the first day, such as the NPS Superintendent, caused some problems in that while answering visitors' questions, several actions were taken too soon, or not taken at all, by the players. It would have been most beneficial if all NPS visitors had observed the second day of the demonstration, after the first day problems had been solved and demonstration procedures had been tried once by the participants. Unfortunately, this was impossible to coordinate because the demonstration schedule for the second and third day was not firm. Although it is understood that NOSC wanted to maintain some flexibility in the demonstration timing there are pros and cons to a firmer schedule when working with a distributed wargaming system. NPS had difficulty estimating when its participation in the game would be heavy. There was no way to predict when the events in which the ASUWC participated would begin, so scheduling NPS visitors at an interesting time was impossible.

The script being used at NOSC and the one at NPS were not the same on the first day. Because of this, several messages which appeared at the Player terminal had no meaning. This was corrected on the second day with the arrival of a new game scenario; however, the disruptive influence of the situation held over into the second day. Furthermore, the detailed procedures prepared by Roland and Associates (R&A) keyed off of game events and actions instead of the associated game event numbers and subletters. This was solved the second day by cross referencing the new game scenario, received on 14 October, with the R&A procedures.

One obvious WES program bug was discovered: when aircraft control is passed to another player, the addressee portion of a WES command becomes garbaged. For example, immediately after the ASUWC received control of flight SS1 through SS5, it was impossible to control the aircraft. The system didn't seem to understand who the proper addressee was for a given order. The garbled addressee location was cleared with a FOR 1.1.3 REPORT SELF command. After this command was executed WES started to accept orders for SS1 through SS5. This same type of situation occurred numerous times after the "PASS CONT" command was used.

Players found it very annoying to not have the capability to delete mistyped entries. This is an RSM problem that can be corrected by a software modification at NOSC and should be requested.

e. STATION 4. BLUE PLAYER VOICE ENTRY. Voice input was tried the first day. Because of problems with the threshold technology tape that was thought to have the appropriate voice command stored, voice input was unsuccessful. The reason for the tape malfunction is not known, but it was either human error or a recording error. It had nothing to do with the effectiveness of voice entry itself. Voice entry was successfully demonstrated on the second and third days.

A new user trained the voice entry equipment for about 1/2 hour and was able to easily run the Player station using voice control only. The biggest problem was attempting to use the TENEX system command ADVISE to interconnect STATIONS 3 and 4. Success was achieved in receiving ADVISE at STATION 3 with STATION 4 entering commands using voice to log on to WES. The echo print on both STATIONS 3 and 4 were appropriate up to the last step of starting the Player.

At that point the letter N , which normally appears as the Player program is starting and waiting to synchronize with WARGAM, did not appear at STATION 4. As the operator continued it happened that commands could be input via voice at STATION 4 but echoed only at STATION 3. It is assumed that perhaps WES or TENEX sends a control character negating the ADVISE output link but keeps the input link open thus allowing input. Eventually STATION 4 was autologged off the system because the system did not realize STATION 4 was being used. At this time the voice input capability terminated until reinitiated by reentering the system. This situation happened on every occasion

that voice was used via the ADVISE link from STATION 4 to STATION 3. A solution was found by reversing the ADVISE link. When STATION 3 initiated the ADVISE link to STATION 4 there was no autologout problem; however, the lack of echo at STATION 4 persisted with no solution discovered.

The Threshold Technology voice input equipment initial training included the full range of alphabetic characters for the contingency of not having the appropriate word or phrase available when needed. It turned out that with the speed of retraining available, additional vocabulary can be added "on the fly." The equipment is easy to use and as easy to retrain. Another factor that should be considered for future demonstrations is the orientation of the equipment. For example, the voice equipment should be moved so that the user will have better access to the threshold technology equipment for retraining words or adding new words to the existing vocabulary.

f. STATION 5. The ADM-type terminal at this station was used on the third day for the PLOTGN program because of the NOSC request to minimize the number of terminals used by NPS. Therefore, BAY 2 or the entire umpire section was closed off and all umpire activities were curtailed. It was easier for participants to handle and watch the PLOTGN program at this terminal than to walk the length of the C^3 lab for just one program. In addition, many other users were in the C^3 lab and logged onto the PDP 11/70 during the period. No resulting degradation in the performance of WES was noticed.

g. STATION 7. BLUE DATABASE. Generally, the use of TED was not too successful during the demonstrations, but advances were made in understanding TED to the point it looks as if it has some real possibilities in future WES demonstrations. The idea behind the use of this station was to provide a natural language database access system that had the same static information that WES was using in the demonstration. This capability has not existed in the past.

In the first day of the demonstration the database user was told the TED system was similar to LADDER. The user was familiar with LADDER and started to use LADDER instructions in addition to the TED commands he was provided with. Unfortunately TED is still being developed and although it is a system similar to LADDER, instruction sets are implemented differently. Many facts about the database organization became apparent during the first day and were incorporated in the database reorganization the third day.

RESET was a spectacular catastrophe because it literally destroyed the database that had been built for the demonstrations. Problems with room security (work on the doors) precluded rebuilding the database for the second day's use. By the third day a partially rebuilt and reorganized database worked fairly well. It was not used because of the NOSC restriction of only essential WES programs running on the third day, because of TENEX system problems. Because of the problems with TED and the laboratory doors, voice access to the data could not be attempted.

h. STATION 10. The use of an additional Conrac for a BLUE repeater display worked very well. It had a high incidence of use for discussions and provided a location that removed disturbances from the BLUE Player.

The process of physically connecting the two CONRAC displays worked well but in the long term could become a nuisance. It is suggested that WES be given the capability to send two pictures (for example two Blue pictures) to two separate displays at any given RSM site and alleviate the need to physically connect slave cable from one display to another.

i. STATION 11. The Tektronix hard copy device proved reliable and useful. It was extremely helpful to be able to get numerous copies of a given message that came into the ASUWC with very little effort. Figures 3-1, 3-2, 3-3 and 3-4 are samples from this station.

j. STATION 12. The Tektronix 4014 performed well. It is recommended that an audio alarm be programmed into messages to announce their arrival. Storage tube (TEK 4014) display blanking was annoying when players tried to read messages some time after arrival. Since there was no bell announcing message arrival, an arriving message could go unnoticed by the communications officer and then the screen would blank out. Thus the message might never be noticed. Also, this device would be a problem if the messages were either close together or long. A second recommendation is to replace this device with a hard copy unit and to create software to store all message traffic in a file in addition to using it during the games. The storage

file can be used for later analysis. This will be especially necessary in future work in experimenting with FCC-TFCC-Task Force organizations and communications.

k. STATION 13. The Ann Arbor terminal used for the communications work was sufficient. An intermittent problem was encountered on entering the template with ABENDs similar to the typical NED sessions. No reason was discovered for these situations.

The ending of a template message was annoying to the operator. The system always automatically responded with the answer YES when the program asked

IS THIS MESSAGE CORRECT?

and the message was immediately sent. The operator was unable to say NO or to change the message.

Once in TEMPLATE there was no way for the user to change his mind about sending a message. The user was automatically committed to sending the message.

Editing within the template using NED was extremely slow. There was also a very erratic movement of the cursor much different than the normal NED responses. One student officer finally, after some trial and error, discovered how to counter the situation but did not resolve the problem.

The canned messages did not include the sendor on the TO and did not have the accommodation for a carbon copy (CC) for the sender. No feedback was provided to the sender for assurance that the message was in fact transmitted.

```
LINK FROM CDC, TTY 106
@BELL.EXE
@TYPE MSG003
***************************************************************************

 171500Z                                                      MSG003

 FM:  CWC

 TO:  AAWC ASWC ASUWC

 SUBJ: SITREP KURIL 1

 EXERCISE KURIL

 1. ORANGE AGI SIGHTED VICINITY TSUGARU STRAITS 171100Z
 PROCEEDING SOUTHERLY DIRECTION.

 2. RESCUE OPERATION BEGUN.  LANDING ON ITURUP ISLAND
 PLANNED 190600Z WITH ALL FORCES CLEAR OF ORANGE BY 191200Z.








***************************************************************************
@BREAK
```

Figure 3-1

```
LINK FROM CDC, TTY 105
@BELL.EXE
@TYPE MSG004
**********************************************************************************

 191500Z                                                             MSG004

 FM:   FCC

 TO:   CWC,AAWC,ASWC,ASUWC

 SUBJ: SITREP 2

 EXERCISE KURIL

 1.KURIL DIVERSIONARY GROUP HAS BEEN ATTACKED BY ORANGE AIR
 AND SURFACE FORCES. USS PARSONS SUNK. SURVIVORS HAVE BEEN
 RECOVERED. REMAINDER OF THE GROUP SUFFERED MINOR DAMAGE AND
 IS WITHDRAWING TO YOKOSUKA.

 2.DEFCON 1 HAS BEEN SET THROUGHOUT PACIFIC COMMAND.




**********************************************************************************
@BREAK
```

Figure 3-2

```
LINK FROM CDC, TTY 100
@BELL.EXE
@TYPE MSG005
****************************************************************************

 200100Z                                                      MSG 005

 FM:   FCC

 TO:   CWC,AAWC,ASWC,ASUWC

 SUBJ: RULES OF ENGAGEMENT (ROE)

 EXERCISE KURIL

 1. IN VIEW OF ORANGE ATTACK ON BLUE FORCES, CTF 11 MAY
 CONSIDER ITSELF IN A CONVENTIONAL WAR SITUATION.

 2. YOU ARE AUTHORIZED TO ATTACK CONFIRMED ORANGE MILITARY
 FORCES. STRIKE FIRST AUTHORITY IS HEREBY GRANTED.

 3. NUCLEAR WEAPONS ARE NOT REPEAT NOT AUTHORIZED.








****************************************************************************
@BREAK
```

Figure 3-3

```
LINK FROM CDC, TTY 106
@BELL.EXE
@TYPE MSG013
********************************************************************************

          MSG013

 FM:   CWC

 TO:   ASUWC

 SUBJ: DETACHMENT

 EXERCISE KURIL

 1. PERGRA. DETACH SPRUANCE.


 BT






********************************************************************************
@BREAK
```

Figure 3-4

NOTE: The availability of several good automatic message handling systems on the ARPANET, and elsewhere, suggests that perhaps the WSSP should incorporate them rather than trying to build another.

ℓ. STATION 14. This Ann Arbor was to be used for weather access and information. The NPS-RSM was unable to connect to FNOC although several attempts were made during each demonstration. A closer coordination effort may have precluded much wasted effort, e.g. Command to Command resource scheduling. Again, had this position worked successfully an audio alarm should have been included in arriving messages or data.

m. STATION 20. The on-site availability of a C^3 lab technician for these demonstrations is an absolute necessity. The only alternative is to have someone else, who is available, to be trained as a system superuser. The C^3 lab technician was available during the demonstrations until 1630 hours, and when needed, located system and network problems efficiently and quickly. Unfortunately, the technician was generally not available during the preparation phases. Again, a Command to Command coordination would have been very helpful in obtaining this support.

n. STATION 21. This station consisted of a Miniterm with an APL keyboard. The need for a communication media independent of WES is apparent. Difficulties experienced at this station were:

- It was confusing to operators to have an APL keyboard.
- The initial understanding at the NPS-RSM was that the NOSC PDP11/70 would be used for communicating on a file called WILLIE. It was discovered through trial and error that NOSC was logged on the TENEX as WILLIE.
- It was during the first game that communication protocols were established. This should be done in the planning stages of the demonstrations/experiments.
- Problems evolved because the Miniterm was not well connected to the RS232 connector. Maintenance should secure these devices during the next effort.
- The first character on the Miniterm print-out was being dropped. The technician should be asked to research this problem and have the necessary system commands (and they are available) ready to use.

o. STATION 22. This station was used for the PLOTGN program and worked well.

p. STATION 25. The EXSUP STATUSBOARD worked well. The flow of information was not good the first day because of extended interruptions by NPS visitors. It was better the second day and not used the third day because of the limited use of NPS equipment as requested by NOSC.

q. STATION 26. The EXSUP display worked well. Comments by the Superintendent and Provost on their visit the first day were expressions of their concern that NTDS symbology was not being used.

A problem evolved on day 2 as there was a miscommunication with NOSC and the EXSUP picture was not immediately available to NPS. The station was not used on day 3.

r. STATION 27. This station was to be used to monitor the NOSC EXSUP and permit the NPS EXSUP a relatively complete "picture" of the game situation. The TENEX commands LINK and ATTACH were used in an attempt to accommodate the effort. It was decided after several futile attempts that the possibility of killing the entire game was relatively high and not worth experimenting with this station. No conclusions have been reached as to how the stations can be linked. It is recommended that this be done prior to the next demonstration and the results of the effort be communicated to NOSC and the other RSMs.

REFERENCES

[1] "Multi-node Network Experiment Definition", Report prepared by Control Data Corporation, 10 October 1980.

[2] "Naval Postgraduate School C^3 Laboratory Configuration For the ACCAT October 1980 TFCC Demonstration", Report prepared by Roland and Associates, 9 October 1980.

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